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OPR: 75 AMDS/SGPB (Capt Maiya Kraus)
Supersedes Hill AFB Instruction 15-102,
1 Dec 97

Certified by: 75 AMDS (Lt Col Donald Hickman)
Pages: 13
Distribution: F

This instruction implements AFPD 48-1, *Aerospace Medicine Program*. It establishes responsibilities and references AFPAM 48-151, *Thermal Injury*, for procedures to protect personnel from the adverse health effects of heat/cold stress when exposed to severe weather while performing their duties. This instruction provides commanders and supervisors with information and guidance to operate continuously in severe hot or cold environments. This instruction applies to all Hill AFB personnel during both peacetime and contingency/exercise operations. This instruction does not apply to aircrew in aircraft cockpits. The Weather (75th OSS/OSW) office, provides Fighter Index of Thermal Stress (FITS) measurements and guidance for aircrew. Reference AFPAM 48-151 for general health support, preventive measures, risk factors, thermal indices, first aid and emergency treatment guidance for heat and cold injuries. Send comments and suggested improvements to this instruction on AF IMT 847, **Recommendation for Change of Publication**, through channels to Bioenvironmental Engineering (75 AMDS/SGPB), 7238 6th Street, Bldg 249, Hill AFB, UT 84056. See **Attachment 1** for Glossary of References and Supporting Information. Maintain and dispose of records in accordance with AFMAN 37-123, *Management of Records*, and the WebRIMS Records Disposition Schedule (RDS).

SUMMARY OF REVISIONS

This instruction includes thermal stress responsibilities and heat stress guidance for exercise and real world contingency operations. This instruction incorporates Hill AFB Instruction 15-102, *Cold Weather Working Conditions*.

1. Responsibilities.

1.1. Commanders. Make sure personnel take thermal stress preventive measures during the summer and winter months and especially when the Wet Bulb Global Temperature (WBGT) index reaches 88°F or the wind chill equivalent temperature reaches 0°F. Apply Operational Risk Management (ORM) principles to activities involving high potential for heat or cold stress injuries. Establish mis-

sion critical tasks based on ORM. Ensure that supervisors are enforcing the use of the “buddy system” when personnel are working outdoors during inclement weather (reference **Attachment 2**).

1.2. 75 OSS/OSW.

1.2.1. Weather will issue an Observed Weather Advisory on an automated weather dissemination system when the equivalent chill temperature reaches 0°F. The advisory will be disseminated on the automated system when the condition is first observed. Thereafter, the advisory will be appended to each hourly weather observation transmitted on the automated system until the criterion is no longer occurring. A transmission on the automated system will be made noting the end of the criterion. The initial and ending advisory messages will be appropriately “flagged” on the automated system to alert the receiving organization that an advisory has been issued (reference **Attachment 3** for notifications).

1.2.2. Calculate wind chill readings when the ambient temperature falls below 45°F.

1.2.3. Weather will issue local weather advisories for cold stress when chill reaches 0°F. Current wind chill can be found on the Hill AFB home page (<http://www.hill.af.mil/>) Reference **Attachment 4** for equivalent chill temperature chart.

1.3. 75 AMDS/SGPB.

1.3.1. Monitors the WBGT index May through September. The potential for heat stress occurs during the hottest portion of the day (typically between 1400 and 1500 at Hill AFB). Based on historical data, Bioenvironmental will monitor from 1300–1600 when the expected high is 95° F or greater to comply with BSD S and AFPAM 48-151. AFPAM 48-151 recommends a minimum of 4 measurements be collected.

1.3.2. Posts the results on the Hill AFB home page (<http://www.hill.af.mil/>) with current Heat Stress Category.

1.3.3. Provides guidance on controlling heat and cold stress.

1.3.4. Takes into account MOPP level, HazMat Protection level and Field Gear when providing heat stress level.

1.4. Public Health (75 AMDS/SGPM).

1.4.1. Provides educational programs and training materials on controlling heat and cold stress of individuals and groups. Including recognition of the signs and symptoms and prevention of heat illness and cold injury combined with the maintenance of personnel’s general aerobic fitness.

1.4.2. Follows-up on heat and cold related illnesses.

1.5. Supervisors.

1.5.1. Ensure that personnel use of the “buddy system” when working outdoors during inclement weather. See **Attachment 2** for “Buddy System” information.

1.5.2. Monitor weather conditions through the Hill AFB website or their directorate, tenant control centers or alert offices before and during outdoor activities. If weather conditions appear to be unfavorable or deteriorating, supervisors should immediately check/ask for weather status. Any supervisor observing outdoor operations that are unsafe due to weather conditions will immediately stop operations and ask for instructions from the control center or alert office. Supervisors will direct compliance with these instructions to make sure all personnel are protected against

heat/cold weather injuries. See **Attachment 5** for Recommended Work-Warming Regimen and Precautions. See **Attachment 6** for Recommended Work-Rest Regimen and Water Intake for Various Heat categories.

1.5.3. When the equivalent chill temperature drops below -20° F, supervisors will report the number and location of personnel working outdoors to their control centers and alert offices. See **Attachment 6** for cold categories and recommended work/rest cycles.

1.5.4. Personnel Protective Equipment: If applicable ensure personnel are trained on the proper care and use of cooling vest.

1.6. Unit Physical Training Leaders.

1.6.1. Ensure outdoor course environmental condition (WBGT or wind chill) are evaluated prior to administering the 1.5 mile run test. (Reference AFI 10-248, *Fitness Program*)

2. Thermal Stress Guidance for Exercise and Real World Contingency Operations.

2.1. Commander's discretion: Contingency operations may require tasks exceeding recommended work/rest cycles (i.e. security forces, CE rapid runway repair, etc.). Commanders and supervisors should apply ORM principles to situations involving potentially hazardous heat stress operations.

2.2. Reference AFMAN 10-2602, *Nuclear, Biological, Chemical and Conventional (NBCC) Defense Operations and Standards*, **Attachment 5**: Mission Oriented Protective Posture (MOPP) Work Rest Cycle and Hydration Charts: MOPP Level and Heat Stress.

2.2.1. During Phase I exercises and Full Spectrum Threat Response (and exercises-FSTR), contact the 75th Aerospace Medicine Squadron, Bioenvironmental Engineering Flight (75 AMDS/SPGB; 777-4551) for assistance with heat stress issues.

2.2.2. During Phase II exercises, address heat stress issues to the Preventive Aerospace Medicine (PAM) Team at the contingency medical site (via the Medical Control Center).

2.2.3. Announcing MOPP Heat Stress Work / Rest Cycles: During exercises and contingencies, 75 AMDS/SGPB (or PAM) will inform the command post (Survival Recover Center) and/or Incident Commander (IC) and/or Fire Department Safety Officer (SO) of the heat stress category, recommended work rest cycle and recommended water intake.

2.2.4. Equivalent MOPP levels for HAZMAT response protective levels (Hill AFB ONLY). For hazardous materials incident responses on Hill AFB, 75 AMDS/SGPB will provide heat stress recommendations to the IC and/or SO using the MOPP level equivalents defined in **Table 1**.

Table 1. HazMat Protective Level and Equivalent MOPP Level for Heat Stress

HazMat Protective Level	Hill AFB Equivalent MOPP Level for Chart in Attachment 3
A	4
B	4
C	2
D (or fire bunkers)	2

3. Reference AFPAM 48-151 , *Thermal Injury*, for the following information.

3.1. Chapter 2, General Health Support, Preventative measures, and Risk Factors (pages 6-8):

- Training, Exercise, and Operations
- Preventative Measures
- Acclimatization to Heat
- Individual Risk Factors for Heat Injury
- Individual Risk Factors for Cold Injury
- Environmental Assessment and Determination of Thermal Injury Risks

3.2. Chapter 3, Thermal Indices (pages. 9-11):

- The WBGT Index
- Fighter Index Thermal Stress (FITS)
- The Wind Chill Factor (WTC)
- BEE Personnel

3.3. Chapter 4, First Aid and Emergency Treatment Guidance for Heat and Cold Injuries. (pages. 16-19):

- Fluid Replacement.
- Fluid Consumption, Sodium Intake and Dietary Supplementation.
- Workload and Fluid Intake in Hot Environments.
- Workload and Fluid Intake in Cold Environments.
- Precautionary Measures During Exercise in the Heat.
- Specialists Occupations in a Hot Environment.
- Cold Environment Considerations.
- Cold Exposure Reduction.
- NBC Operations and Uncompensable Heat Stress (UCHS)
- Training and Education

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Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 10-248, *Fitness Program*

AFMAN 10-2602, *Nuclear, Biological, Chemical and Conventional (NBCC) Defense Operations and Standards*

AFMAN 32-4005, *Personnel Protection and Attack Actions*

AFMAN 37-123, *Management of Records*

AFPD 48-1, *Aerospace Medicine Program*

AFPAM 48-151, *Thermal Injury*

American Conference Governmental Industrial Hygiene Threshold Limit Values 2001.

HQ AFMOA/CC Policy Letter, Cold Weather and Rest Schedules, 14 Feb 2002

US Army Research Institute of Environmental Medicine (USARIEM) Technical Note No. TN/02-2

Hill AFB propositioned BSD S

Abbreviations and Acronyms

FITS—Fighter Index Thermal Stress

IC—Incident Commander

ORM—Operational Risk Management

RDS—Records Disposition Schedule

SO—Safety Officer

UCHS—Uncompensable Heat Stress

WBGT—Wet Bulb Globe Temperature

Terms

Wet Bulb Globe Temperature (WBGT) Index Explanation—The Bioenvironmental Engineering Flight (75 AMDS/SGPB) calculates WBGT index from dry bulb temperature, wet bulb temperature (i.e. humidity and wind speed), and black globe temperature (i.e. solar load) readings. When the WBGT index reaches 88°F WBGT, high heat stress conditions exist. At 90°F WBGT, the risk of heat illness is extreme. *NOTE:* This is NOT the same as the heat index, which is an apparent temperature that gives an idea of what it would feel like at low humidity conditions. The heat index is a function of temperature and relative humidity, but is NOT a good indicator of heat stress risk.

Wind Chill Temperature (°F)—The temperature adjusted for the cooling effect of the wind in a cold environment. This is calculated using ambient temperature and wind velocity.

Attachment 2**BUDDY SYSTEM**

A2.1. During periods of adverse weather, personnel working outdoors (exposed to both extreme heat and cold weather conditions) should perform their duties with a co-worker, when authorized by supervision, to check each other for signs of frostbite, hypothermia, excessive chilling, heat exhaustion and/or heat stroke.

A2.2. Supervisor/co-worker responsibilities include monitoring themselves and others for signs and symptoms of heat/cold related injury and illness, and ensuring all personnel consume appropriate amounts of water for the level of work that is being performed.

A2.2.1. Heat exhaustion. This is caused by loss of body salt and fluids or failure to provide the body with an adequate amount of fluids and is a sign that the body is not regulating the heat load. Individuals with symptoms of heat exhaustion will have pale, clammy skin; headaches; dizziness; clumsiness, irritability, general weakness; and nausea. Remove the individual from the heat source and attempt to cool them by having them drink water and elevating their legs to ease blood flow to the brain. Since personnel may faint they should be relieved of their duties and taken to a safe area. The signs and symptoms seen in heat exhaustion are similar to those of heat stroke, a medical emergency. Give the individual fluids slowly and only if they are conscious and are not vomiting. Do not leave them unattended at any time. Heat exhaustion can lead to heat stroke and become a medical emergency. Seek medical attention immediately.

A2.2.2. Heat stroke. This occurs when the body can no longer regulate the core temperature and results from extreme loss of fluids. Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating; hot, red, dry skin; and an abnormally high body temperature. If the body temperature is too high, death will follow. If a worker shows signs of possible heat stroke, call 911 immediately. The worker should be placed in a shaded area and the outer clothing loosened or removed. Wet or immerse the individual's body with cool water and fan them. Give the individual fluids slowly and only if they are conscious and are not vomiting. Do not leave them unattended at any time.

A2.2.3. Frostbite. The symptoms are loss of feeling in the affected area, and a "dead white" appearance of the affected flesh. Particular attention must be paid to the nose, cheeks and ears for visible signs of frostbite. If frostbite is suspected, obtain medical advise from qualified medical personnel immediately.

A2.2.4. Hypothermia. The symptoms of hypothermia (exposure) are fits of shivering, vague and slurred speech, memory lapses, fumbling hands, lurching walk, drowsiness and exhaustion, and apparent unconcern about physical discomfort. Personnel are subject to hypothermia when exposed to prolonged freezing temperatures, but symptoms are usually noticed by others before the victim is aware of them. If hypothermia is suspected, medical personnel will be contacted immediately, as hypothermia can result in death if untreated.

Attachment 3**ORGANIZATIONS REQUIRING NOTIFICATION OF ADVERSE WEATHER WORKING
CONDITIONS**

A3.1. Base Operations.

A3.2. Air Traffic Control Tower.

A3.3. Command Post.

A3.4. 388th Maintenance Operations Center.

Attachment 4**WIND CHILL TEMERATURE INDEX REFERENCE VALUES AND ADVISORY FLAG COLORS****Table A4.1. Wind Chill Index and Flag Colors.**

WINDSPEED		TMEPERATURE (F)									
CALM	CALM	40	35	30	25	20	15	10	5	0	
KNOTS	MPH	EQUIVALENT CHILL TEMPERATURE									
3 to 6	5	35	30	25	20	15	10	5	0	-5	
7 to 10	10	30	20	15	10	5	0	-10	-15	-20	
11 to 15	15	25	15	10	0	-5	-10	-20	-25	-30	
16 to 19	20	20	10	5	0	-10	-15	-25	-30	-35	
20 to 23	25	15	10	0	-5	-15	-20	-30	-35	-45	
24 to 28	30	10	5	0	-10	-20	-25	-30	-40	-50	
29 to 32	35	10	5	-5	-10	-20	-30	-35	-40	-50	
33 to 36	40	10	0	-5	-15	-20	-30	-35	-45	-55	
		CAUTION					DANGER				

Based upon AFPAM 48-151

Attachment 5**RECOMMENDED WORK PRACTICE GUIDANCE IN COLD ENVIRONMENTS****Table A5.1. Work Practice Guidance in Cold Environment**

Work Intensity <i>(See Attachment 6, Table A6.2.)</i>	Recommended Precautions and Hourly Work/Warming Cycle¹		
	Little Danger	Increased Danger	Great Danger
Hard	Close observation by supervisors, gloves optional; gloves mandatory below 0°F (-18°C)	Cold weather gear; mittens with liners; exposed skin kept covered and dry, rest periods in warm, dry shelter. Change wet clothes immediately. Limit outdoor operations with water. Avoid activities resulting in heavy sweating. Prevent dehydration – water intake: 4 qts/day (sedentary), 5-6 qts/day (active)	Postpone non essential activities; essential tasks only with <15 minutes exposure, all exposed skin covered
Moderate	Increased surveillance; cover exposed skin where possible; mittens with liner below 10°F (-12°C); keep skin dry	As above plus restrict non-essential tasks; operate 30-40 minute work cycles with frequent supervisory surveillance	Mission Critical Activity only ²
Light	Moderate workload precautions plus full head coverage below 10°F (-12°C); cold weather boots below 0°F (-18°C); shorten duty cycle and provide warming facilities	As above plus cancel or postpone all non-essential activities; 15-20 minute work cycles for essential tasks; work groups of no less than 2 personnel, no exposed skin	Mission Critical Activity only ²

Guidelines derived from USARIEM Technical Note TN/02-2 Dated Oct 01

¹ Warming should be in an indoor, heated environment.

² The unit commander will determine mission critical tasks

NOTE: This table is only intended as a guide, all factors and conditions must be taken into account. They should not be used as a substitute for common sense or experience. Individual requirements may vary greatly.

Attachment 6**HEAT INJURY PREVENTION CHART****Table A6.1. Recommended Work-Rest Regimen and Water Intake.**

SUPERVISOR'S HEAT INJURY PREVENTION CHART						
Heat Category/ Flag Color	LIGHT WORK		MODERATE WORK		HARD WORK	
	Work/Rest Cycle (min)	Water Intake (Qt/hr)	Work/Rest Cycle (min)	Water Intake (Qt/hr)	Work/Rest Cycle (min)	Water Intake (Qt/hr)
0 (Blue)	No Limit	As Needed	No Limit	As Needed	No Limit	As Needed
1 (White)	No Limit	0.5	No Limit	0.75	40/20	0.75
2 (Green)	No Limit	0.5	50/10	0.75	30/30	1.0
3 (Yellow)	No Limit	0.75	40/20	0.75	30/30	1.0
4 (Red)	No Limit	0.75	30/30	0.75	20/40	1.0
5 (Black)	50/10	1.0	20/40	1.0	10/50	1.0

These guidelines are not a substitute for common sense. Supervisors and commanders shall closely monitor their personnel. These guidelines are recommendations only and should be practiced as mission requirements allow

Table A6.2. Examples Of Activities Within Work Rate Categories.

WORK RATE	ACTIVITY EXAMPLES
LIGHT	Sentry/Guard Duty Grounds keeping(open mower/tractor; trash pickup) Pilot Ground Activities Outdoor supervisor/ QA/QC Sitting with moderate arm and leg movement
MODERATE	Refueling Flightline Maintenance Walking on level ground at 6 km/hr
HARD	Armament Crew Rapid Runway Repair Heavy Aircraft Repair Intermittent heavy lifting with pushing and pulling